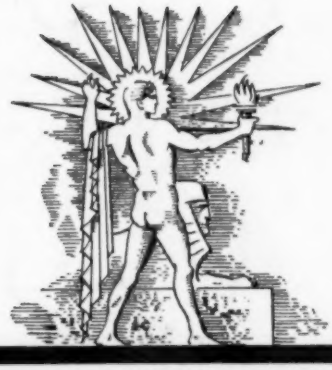
PRICE
15¢
TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

PUBLIC LIBRARY
FEB 6 - 1940
DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



February 3, 1940

Wings for Fortresses

See Page 72

A SCIENCE SERVICE PUBLICATION

Do You Know?

Seattle has the largest community forest in America—66,000 acres.

Farm families are the best-fed population group in the United States, village families the poorest fed, a survey shows.

In buying gold from their subjects, Ashanti kings of West Africa used to employ an exceptionally heavy set of weights.

War in Finland has caused a mass migration of 400,000 Finns, mainly women and children who have fled toward Norway and Sweden.

Makers of incandescent lamps use extreme care: moisture of a single drop of dew would be enough to cause early blackening of half a million lamps.

The oldest pottery yet found in China, says C. W. Bishop, Freer Gallery archaeologist, is a thick, coarse, gray-colored ware shaped by hand.

Highest voltage X-ray tubes yet made are turned out for the National Bureau of Standards: one use will be measuring X-ray dosage for medical purposes.

Indians of Turtle Mountain Reservation, North Dakota, canned more than 38 tons of wild fruit and berries last summer.

In an Egyptian tomb, archaeologists found a picture of a black puppy under his master's chair; and the dog's name in hieroglyphics was "Ebony."

India's population is expected to be 383,000,000 when the 1941 census is taken.

A storage battery in good condition is 100% efficient at 80 degrees temperature, but only 42% efficient at zero, an automotive engineer states.

Over 41% of the United Kingdom's imports in recent years have consisted of foodstuffs.

Cherry juice extracted hot has superior color and body, but when pressed cold it tastes better; so combining the two is technique for "all-round quality juice."

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

Aeronautics

How rapidly are the flying fortresses being completed? p. 72.

What system of blind landing has been selected as the standard? p. 69.

Aeronautics—Engineering

On what military discoveries have patents been recently granted? p. 70.

Agriculture

What peaceful use has been found for tear gas? p. 78.

Anatomy

To what is a shortage of human skulls attributed? p. 72.

Astronomy

How did scientists seek the date the Egyptians started their calendar? p. 71.

Bacteriology

Where do we get the agar used as a culture medium in the laboratory? p. 68.

Biology

What effect has colchicine on a mammal egg cell? p. 67.

Chemistry

What war uses have been found for plastics? p. 73.

Dentistry

What new cure has been found for tooth abscesses? p. 67.

Eugenics

To what number would birth control advocates limit the family? p. 70.

Engineering

What part is air conditioning playing in munitions manufacture? p. 73.

Engineering—Biology

Why is a firefly's cold light not practical for man? p. 72.

Geology

How did the oil wells in Michigan aid in the discovery of new wells in Nebraska? p. 79.

Medicine

For what ill are snake venom and Indian arrow poison used? p. 68.

What new hope is there of a specific cure for Rocky Mountain spotted fever? p. 71.

Military Science

To what sort of movie does the rookie have to go? p. 74.

Why is it thought that Germany's artillery has few surprises in store? p. 78.

Ornithology

How did a single bird cause a submarine scare? p. 73.

To what depth does a duck dive for food? p. 72.

Photography

How can fine woods be imitated photographically? p. 77.

Psychology

How is emotional stability measured electrically? p. 76.

Public Health

How does friendliness act to spread influenza? p. 67.

Radio-Aeronautics

How does the German bomber find his way to England blind? p. 77.

Zoology

Why does the London zoo want someone to "adopt" a sea lion? p. 73.

SCIENCE NEWS LETTER

Vol. 37 FEBRUARY 3, 1940 *No. 5*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1940, by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the postoffice at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at $3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and Journalistic profession.

Board of Trustees—*Honorary President*: William E. Ritter, University of California. Representing the American Association for the Advancement of Science; J. McKeen Cattell, Editor, Science; Henry B. Ward, University of Illinois; Edwin G. Conklin, *President*, American Philosophical Society. Representing the National Academy of Sciences: W. H. Howell, *Vice-President and Chairman of Executive Committee*, Johns Hopkins University; R. A. Millikan, California Institute of Technology; Harlow Shapley, Harvard College Observatory. Representing National Research Council: C. G. Abbot, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry; Ross G. Harrison, Yale University. Representing Journalistic Profession: John H. Finley, Editor, New York Times; Neil H. Swanson, Baltimore Evening Sun; O. W. Riegel, Washington and Lee School of Journalism. Representing E. W. Scripps Estate; Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Warren S. Thompson, Miami University, Oxford, Ohio; Karl Bickel, E. W. Scripps Co.

Staff—Director, Watson Davis; Writers, Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter; Correspondents in principal cities and centers of research. Photography: Fremont Davis; Librarian: Minna Gill; Sales and Advertising: Hallie Jenkins, Austin Winant, Howard Bandy.

BIOLOGY

Colchicine Used on Rabbits To Double Chromosomes

Same Powerful Chemical Used to Create New Plants Now Used on Mammal but Won't Produce Super Race

THE same powerful chemical that has been used in the creation of new and larger fruits and flowers has been tried on rabbit egg cells.

Colchicine, which doubles the number of heredity-bearing chromosomes in plant cells, allowed the production experimentally in glass vessels of rabbit egg cells with double the normal body number of chromosomes. The research is reported by Drs. Gregory Pincus and C. H. Waddington of England's Cambridge University. (*Journal of Heredity,* December)

Cell division in the experiments did not go beyond the very earliest stages of development. For the present at least, therefore, dreams of colchicine-induced races of giant super-rabbits (and, by inference, of giant super-men) must remain only dreams.

Artificial increase in mammalian chromosome numbers has never been accomplished before, and natural occurrence of higher numbers of these heredity-bearing units in the cell's nucleus has been reported only once or twice, and then not in egg cells but in structures associated with the developing embryo.

Drs. Pincus and Waddington accomplished their results by treating fertilized rabbit egg cells with colchicine, already well known for its chromosome-multiplying effects in plants. They also used alcohol, ether, and abnormally high temperatures; but colchicine was most effective.

The doubling of chromosome numbers resulted from the slowing down of the cell division process. The first stages of division, in which the chromosomes split and thereby double their number, went through as usual, but the cells then failed to finish the process, leaving the two sets of chromosomes in the undivided cells.

Subsequently a few of these cells did divide, but only at a rate less than normal. In no case did such divisions go beyond the very earliest stages.

Dr. Pincus was formerly connected with Harvard and Clark Universities and the present work was aided by grants from the Josiah Macy, Jr., Foundation and The Milton Fund of Harvard University.

Science News Letter, February 3, 1940

A MAGNET

This 100-pound girl is held suspended by the tiny magnet at the top of her swing. If a 160-pound man could lift 720,000 pounds, he would only be doing the job which the newly developed magnet can do. Invented by G.E. scientists, the new magnet can lift 4,500 times it own weight, tops previous record of 1,500. Made of alnico, alloy of aluminum, nickel, iron and cobalt pressed together as a powder and sintered, the new tiny magnet gets its lift by a new design arrangement of its parts. Alnico itself can lift only 500 times its own weight. Surprising demonstration is to see the minute three-fourths ounce magnet hold up 200 pounds in tests. Uses: For better permanent magnets used in telephones, radio loud speakers and many another electrical device.

DENTISTRY

Abscessed Teeth Treated With Hot Sulfanilamide

One Treatment Reported to Have Cleaned Up Abscess That Had Persisted for Ten Years; May Aid Sinuses

SUCCESS in the treatment of abscessed teeth with the chemical remedy, sulfanilamide, was reported by Dr. Fred R. Adams, of New York, at the Greater Philadelphia Dental Meeting in Philadelphia.

One injection directly into the abscess of a hot sulfanilamide solution killed all the trouble-making germs in every case but two, Dr. Adams reported. One case required two such treatments and another, three. Some of the abscesses that were cleaned up in one treatment had persisted for 10 years. X-ray pictures of these cases showed that after a few months new bone had grown to fill the area formerly occupied by the abscess.

Heating the sulfanilamide solution for treatment is important, Dr. Adams emphasized. A stronger concentration of the drug can be obtained in hot water and the heat reenforces the chemical's action on the germs, he explained.

This method of using a hot sulfanilamide solution for irrigation should, in Dr. Adams' opinion, be useful in treating infections in other parts of the body, such as sinus infections and the bone diseases osteomyelitis and osteitis and in cellulitis involving bone.

Science News Letter, February 3, 1940

PUBLIC HEALTH

Friendliness May Act To Spread Influenza

SIDELIGHTS on the present influenza outbreak, if we are having one, it being difficult to tell statistically until it is pretty much well underway or over:

South Carolina has had an unusual amount of flu and infantile paralysis, which is puzzling because the population there is generally well fed and health services good. Suggested explanation is that the good roads plus the so-

ciability of the people may be a factor. South Carolinians speed around the state at the drop of an invitation. They are gregarious, friendly folk. And germs travel with them, unfortunately. The more people go about, congregate, the more chance there is of diseases being spread fast and dangerously.

It may be difficult to estimate just how severe this flu prevalence really is, oddly, because of success in combatting pneumonia that frequently follows flu. Sulfanilamide and its relatives, sulfapyridine, sulfathiazole, etc., are being used widely with evident success. And success will ruin the statistical criteria (pneumonia deaths) which will be tough on the statistics but saving of lives.

Because the way influenza spreads is known, there is one general measure that can be advised as a preventive. That is to avoid contact with persons who have the disease. In line with this it is advisable in an influenza period, says the Public Health Service, to keep out of crowds, especially indoors, as much as possible; to refrain strictly from using common drinking cups, common towels and the like; to wash the hands thoroughly before eating; and to keep the fingers away from mouth and nose.

The federal health service also has the following advice for those unfortunate enough to contract influenza:

"If there is fever, go to bed at once, send for a physician and follow his instructions. If medical service is not available, staying in bed carefully covered for three or four days, or until all symptoms have disappeared, is a valuable precaution against any dangerous development of the illness. The return to one's usual occupation should be gradual, and at first care should be taken not to get overtired. Medicine or drugs of any kind, unless prescribed by a physician, should never be taken; no specific cure for influenza is yet known."

Science News Letter, February 3, 1940

BACTERIOLOGY

Japan Sole Source of Agar, Important Biology Material

Seaweed From Which It Is Made Grows on U. S. Coast But Process Requires Large Amount of Hand Labor

JAPAN has a world monopoly of one commodity that the average person never sees and seldom hears about, yet which indirectly is of considerable importance to his health and well-being. It is the stuff called agar, a gelatin-like material made from seaweeds.

Agar is indispensable as a culture medium in all bacteriological laboratories, and hence to all hospitals, medical schools, and research institutions occupied with problems in foods, dairy products, soils and all other phases of pure and applied microbiology. Indigestible itself, it is the best substance known to hold in readily available form such favorite germ foods as glucose, beef extract, boiled potato, and blood. Agar, in tubes, plates and flasks, is the germs' laboratory dining-table.

Agar comes in dried form, as a grayish, light, stringy solid. It will take up many times its volume of water to form a slightly amber, translucent mass that looks exactly like ordinary gelatin dessert. As a matter of fact, sweetened and flavored agar has been used to some extent as a dessert material, and also in medicines where smoothness and bulk are desiderata, but most of the importation has continued to go to laboratories.

Department of Commerce figures show that the United States buys between 600,000 and 700,000 pounds of the dried product every year. The price has been as low as 25 cents a pound, but in recent years it hit the dollar-a-pound mark, and at the present moment the price is $1.50 a pound bid, and little or no agar offered. The Japanese say that severe storms around their islands during 1939 have interfered seriously with the seaweed harvest.

If American and world laboratories were completely deprived of Japanese agar they would not be permanently crippled, although admittedly there would be a period of embarrassment and confusion similar to that experienced on a larger scale when the German sources of dyestuffs and drugs were cut off in 1914. The several species of red seaweed from which agar is made grow in many parts of the world, including the warmer coasts of the United States; and the manufacturing process is well known and not complicated.

The principal reason why the Japanese have been permitted to enjoy a monopoly in agar is that its making, and especially the harvesting of the seaweed, involve a large amount of hand labor, and such labor is cheapest in Japan.

It is reported that an effort is being made to build up an agar manufacturing industry in the Netherlands East Indies, and a concern in southern California has been producing it more or less intermittently. If real need arose, and especially if a cheap mechanical method for harvesting seaweed could be devised, there is no reason why America's needs for this obscure but important plant material should not be supplied from American sources.

Science News Letter, February 3, 1940

MEDICINE

Cobra Venom and Curare Used for Arthritis

TWO POWERFUL poisons, cobra venom and curare, the old Indian arrow poison, have been taken from the ranks of killers and put to use in healing two widespread human afflictions, arthritis and the mental disease schizophrenia.

In schizophrenia, the Indian arrow poison protects patients from injury during metrazol convulsions which are used to shock them back to sanity. Good results with this combination of curare and metrazol are reported by Dr. A. E. Bennett of Omaha, (*Journal, American Medical Association*, Jan. 27) Dr. Bennett cautions against general use of the poison with metrazol until further experiments have been made. He has also been using it "with encouraging results" in treatment of children suffering from spastic paralysis.

Deadly cobra venom injected into the muscles of patients suffering from neuralgia and various rheumatic conditions caused slight or moderate improvement in a little over half the cases, Drs. Otto Steinbrocker, George C. McEachern, Emanuel P. La Motta and Freeman Brooks, of New York City, report. Other methods of treatment had failed to relieve almost all the patients. Patients with rheumatoid arthritis were helped more by the cobra venom treatment than those with other complaints. The venom was first given in small doses as recommended by Dr. D. I. Macht, of Baltimore, but larger doses were soon found necessary.

Science News Letter, February 3, 1940

HAIR-RAISING

This visitor at the New York Museum of Science and Industry is making her own hair stand on end, quite literally, by sending an electric charge of half a million volts through her body. The static electricity generated for this experiment is harmless.

AERONAUTICS

Indianapolis Landing System Selected As the "Standard"

Committee of National Academy of Sciences Selected CAA System for Extension to Other Airports in Nation

THE INSTRUMENT blind landing system, just selected as standard for the nation by a committee of the National Academy of Sciences, at the request of President Roosevelt, was described before the American Institute of Electrical Engineers at New York.

The new blind landing system, which has been recommended for installation at once at many of the nation's leading airports, was created to meet the rigid safety specifications of the Civil Aeronautics Authority in Washington. The trial installation, at the Indianapolis Municipal Airport, has used short wave radio beam signals.

In tests since last September more than 50 blind landings have been made in heavy rain, blinding snow, low ceiling and poor visibility which would ordinarily ground all planes and prevent landings. Transport and military pilots alike have been receiving training with the system.

The four-man research team of W. E. Jackson, C.A.A. expert, A. Alford and P. F. Byrne of the International Telephone Development Company, and H. B. Fischer of the Bell Telephone Laboratories, Inc., described the perfected system for the electrical engineers.

A committee of the National Academy of Sciences, headed by Dr. Vannevar Bush, president of Carnegie Institution of Washington, recommended to President Roosevelt that the Indianapolis-CAA system be extended to other airports in the nation, military and commercial, as the best blind landing system now developed.

The scientists' committee also urged that intensive research be undertaken for the perfection of another blind landing system using ultra-short micro radio waves. This system — employing waves only a few inches long—has been developed at Massachusetts Institute of Technology.

The MIT-CAA system was described at the electrical engineers meeting by five M.I.T. scientists, E. L. Bowles, W. L. Barrow, W. M. Hall, F. D. Lewis and D. E. Kerr.

Where the newly selected "standard" system at Indianapolis uses radio waves of from 75 to 112 megacycles frequency (2.6 to 4 meters wavelength) to create glide paths and marker points, the M.I.T. system employs "horn" types of radio transmitters because its microwaves have many of the properties of ordinary light and can be projected in given directions quite like a beam from a searchlight.

An advantage claimed for the M.I.T. system is that a straight glide path can be achieved which meets the ground at a small angle. The Indianapolis system, in contrast, comes down on a straight line glide but near the ground goes into a slight curve to create a less abrupt landing.

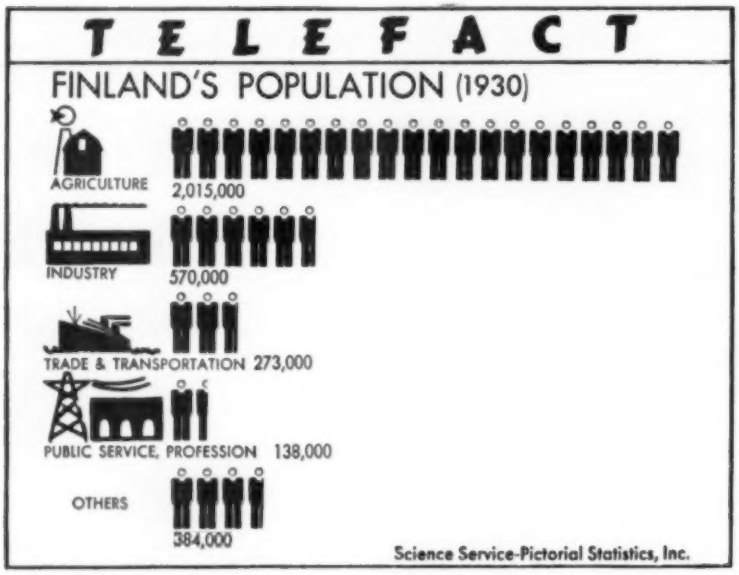
Although more research is needed on the microwave blind landing method, it is claimed for the system that its glide path is constant in pattern and in angle and is not distorted by the ground or surrounding objects. This means that the radio transmitters for the M.I.T. system can be truly portable and can be moved from one airport to another if needed.

The M.I.T. system uses 50 centimeter waves (less than two feet in length) but it should be possible to operate it on still shorter waves and obtain even sharper definition of the radio beam. The M.I.T. scientists report:

"Not many years ago it would have been improvident to predict that within one year a practical 50-centimeter landing system based on the experimental type described here could be installed for pilot training, and it would have been heresy to say that within two years a 10-centimeter system could be made available for this purpose, yet now such is our confidence that on the basis of contemporary developments in the industry and elsewhere these predictions may now be made with reasonable assurance of fruition."

Science News Letter, February 3, 1940

When automobiles were "young," one argument for thinking they would never amount to much was this: horses could see at night, but the horseless carriage couldn't.



AERONAUTICS—ENGINEERING

Retractable Wing Pontoons For Giant Flying Boats

Patents Are Also Granted on Improved Machine Gun, Radio Beacons, Alloys, Warm Sheets, Vulcanized Carpet

HIGHER flying speeds and greater flying range are promised by a new method of retracting the huge wing pontoons of great seaplanes into the wings, described in Patent No. 2,187,040 granted by the U. S. Patent Office to I. M. Laddon, W. A. Ring and H. I. Mandolf of San Diego, Calif., and assigned to the Consolidated Aircraft Corporation. The patent shows how the landing pontoons fold up beneath the wing tips, become part of the airfoil section and decrease air resistance greatly.

An improved type of machine gun which is claimed to provide more accurate firing is described in patent No. 2,186,969 of Samuel G. Green of Gray, Ga. The invention times the firing position of the gun so that it comes always at the proper period of the recoil and counter recoil cycle. According to the patent, other machine guns fire when the breech block is near the closed position regardless of the position of the gun in its recoil cycle.

A new kind of vulcanized, sponge rubber carpet is the invention of H. P. Faris, Philadelphia, and D. W. Yochum and R. B. Logan of Trenton, N. J., granted patent No. 2,187,140. The carpet fabric is cemented onto a base of soft rubber which is simultaneously vulcanized and blown with air to form a sponge rubber base.

Two new types of radio beacon systems were among the patents of the week, No. 2,187,097 to Francis Pope of Glendale, Calif., improves the present quadrant signals which are now used extensively in aviation to mark airports. Signals A and N are sent in code by this device. They blend into an "on course" signal in the pilot's earphones.

The new invention overcomes a prior trouble of these systems; that the pilot —when receiving the on course signal, could not tell by the signal alone along which line he was approaching.

Another new radio beacon is that of Ernst Gerhard of Berlin (No. 2,187,618) which employs a parabolic type of reflector to project—in searchlight fashion —two nearly parallel short wave radio signals into space. As these signals diverge, a line of equal intensity is provided which can be used to mark a given position or a line of descent for an airplane.

From Germany also came patent No. 2,187,094 granted to J. Pink of Wiesswasser in Lausitz for an improved means of spinning glass filaments and fibers from molten glass.

Two new metal alloys received patents. No. 2,187,379 went to F. R. Hensel and K. L. Emmert of Indianapolis, Ind., for a new silver base alloy of high tensile strength that is useful for electrical make-and-break contacts and switches.

Charles J. Schafer of Baltimore, Md., was awarded patent No. 2,187,630 for a superior quality alloy metal for machine cutting tools. Among the elements used in the alloy are iron, zirconium, molybdenum, yttrium and combined columbium-tantalum.

For sleepers who dread cold sheets on a chilly night is patent No. 2,186,965 of Annette Fridolph, New York City, for a sheet woven in two ways. The middle part is the standard weave with its relatively smooth, cold feel, while the ends are woven with a napped surface forming a relatively soft, warmer surface.

To the well-known facsimile expert W. G. H. Finch, Spuyten Duyvil, N. Y., was awarded patent No. 2,187,374 for an improved method of transmitting colored and black-white pictures over telegraph lines.

Science News Letter, February 3, 1940

EUGENICS

Four to Six Children Urged At Birth Control Meeting

DEMANDS for large families, with four to six children the rule, not the exception, were made, paradoxical as that may seem, at the meeting of the Birth Control Federation of America. At the same time, the support of the birth control movement by labor unions was hinted.

The demand for large families by proponents of birth control is not surprising to those who have followed the movement. Except in cases where medical or health conditions show that childbirth would be dangerous for mother or child, small families or childless marriages have not been advocated by the Birth Control Federation.

Planned parenthood is the objective of this group: Planned parenthood for large families among the rich, the poor and the college-educated, alike, but planned so that the children are no closer than two years.

"Births should be spaced two to four years apart," declared Dr. Roy Norton, of the University of North Carolina. North Carolina was the first state in the nation to have a birth control program

sponsored by the state health department.

"Indiscriminate pregnancies are dangerous to mother and baby and therefore harmful to the race," Dr. Norton continued, urging that three to six children in every family should be encouraged and that "the very best" birth control information should be available to every young married couple.

A corollary to planned parenthood is the provision by the community of "economic and social conditions which will make it possible for thoughtful and responsible parents at any economic level to plan for families of at least three or four children with reasonable assurance that the basic needs of the children with respect to nutrition, housing, recreation, medical and dental care and education will be met," Dr. Frederick Osborn, of the American Museum of Natural History, pointed out. He urged the birth control leaders to extend their activities into these related fields so that parents desirous of having children and planning for their future will feel secure to do so.

The suggestion that labor unions may soon support the birth control movement came from Mark Starr, educational director of the International Ladies' Garment Workers' Union. He said, in part:

"I cannot pretend to speak officially for labor, but it does seem to me that, sooner or later, trade unions must join the increasing number of religious, educational and social-work organizations which sponsor adequate education concerning human biology and birth control information and the techniques obtainable from reputable clinics and physicians."

Science News Letter, February 3, 1940

ASTRONOMY

Turning Back Stars Gives Date Egyptians Launched Calendar

Scientists Run Buhl Planetarium Backwards Through 5,200 Years of Sky History to Find Exact Time

BY patiently running the Buhl Planetarium machine back through 5,200 years of sky history, until it flashed on the ceiling the star-picture seen by Egyptians the night of June 18, 3251 B.C., Dr. Jotham Johnson, University of Pittsburgh archaeologist, believes he has found the exact date when Egypt's famous calendar started.

Egyptians had no Leap Year provision, which explains why their calendar got out of step with the sun, and which also has given historians a clue to the date when their 365-day calendar must have been invented.

"Lacking a Leap Year, the Egyptian calendar fell back one day every four years," explains Dr. Johnson. "And in 1,456 years, their calendar slipped back an entire year. That 1,456 years of slipping back is called the Sothic Cycle. We know, by authenticated written records, that a Sothic Cycle ended in 139 A.D."

Counting back, historians have speculated that the Egyptian calendar might have started 4229 B.C. or 2773 B.C. Dr. Johnson considered one of these dates too early, because Egypt was too primitive then, and the other date too late in Egypt's civilization. He pinned his theory to 3251 B.C. and seized an opportunity to check it when the Buhl Planetarium machine could be run backward for ten hours to reach such ancient sky patterns.

Historians, he says, are certain that Egyptians started their calendar when Sirius, the Dog Star, brightest star in the sky, appeared over the eastern horizon just before the sun came up. The natural time of year for the Egyptians to start their calendar, he adds, was when the Nile flood began, soon after the middle of June. Dr. Johnson sought, therefore, for Sirius to appear just before dawn in the mid-June sky picture of 3251 B.C., and to his delight the Planetarium confirmed his theory.

Additional evidence for his theory, he reports, is finding that a thin new moon appeared that night in the west just after sunset. Since the earlier Egyptian calendar had been a primitive one based on the moon, it would be natural, he explains, for them to want to change smoothly to a sun calendar, and this would mean choosing some night when a new-moon month was beginning.

Science News Letter, February 3, 1940

Hydroponics is a term for growing plants by water culture.

MEDICINE

New Serum Will Cure Spotted Fever, Is Hope

SERUM that may prove a cure for dangerous Rocky Mountain spotted fever, the tick-borne disease that every summer threatens ranchers in the far West and suburbanites on the Eastern seaboard, has been made by Dr. Norman H. Topping, National Institute of Health of the U. S. Public Health Service.

The serum, so far used only on guinea pigs and monkeys, is "the first definite hope of a specific treatment for Rocky Mountain spotted fever," officials of the National Institute of Health declared.

Guinea pigs and monkeys survived usually fatal doses of spotted fever virus when treated, after they became sick, with blood serum from rabbits that had been immunized to the virus. Details of the preparation of the serum are reported by Dr. Topping. (*Public Health Reports,* Jan. 12.)

Public health officials hope the serum will prove as useful in treating sick humans, but that cannot be determined until more of the serum has been made.

While this serum will, it is hoped, prove useful in treating sick humans, the federal health service has recently announced a new method of making a vaccine to protect against Rocky Mountain spotted fever. Advantage of this new vaccine over the old one is that it can be made on a large scale. The difficulty and danger of making the old vaccine limited the amount that could be made, and thus its usefulness.

Neither the vaccine nor the serum, however, is yet available for general use. Further tests must still be made with them, it was explained.

Science News Letter, February 3, 1940

MEDICINE

Sex Gland Disturbances May Cause Some Cancers

UPSET in the balance between male and female sex hormones in either men or women may be an important factor in the development of some types of cancer, Drs. V. Korenchevsky and K. Hall, of the Lister Institute of Preventive Medicine, London, England, suggest on the basis of their latest experiments. Details of the experiments, in which pre-cancerous changes occurred in rats when the male-female sex hormone balance was shifted, are reported in *Nature*.

Science News Letter, February 3, 1940

AERONAUTICS

New Flying Fortress Finished Every Four Days

See Front Cover

ROW upon row of wing panels for the 4-engine B-17B bombers, ready for the final assembly line are shown on the front cover of this week's SCIENCE NEWS LETTER.

This is the first picture released by the U. S. Army Air Corps showing the construction of these giant bombers.

The wings are complete with landing gear, engine nacelles and virtually all installation except the engines themselves. Great overhead cranes gently lift the wings on end and carry them to another building where they are joined to the fuselage and where engines are installed.

Every four days a new 22-ton flying fortress is completed at this Seattle plant of the Boeing Aircraft Company

Science News Letter, February 3, 1940

PSYCHOLOGY

Listening Will Bring Out A Child's Individuality

A RECIPE for drawing out the secret individuality in children and in adults as well, is offered by the chairman of the department of creative education at New York University.

"Move and speak with exaggerated slowness," urges Prof. Hughes Mearns. "Listen without comment. Ask no questions at all until you have learned to inquire without implying accusation of sin. Remove every vibration of superiority from eyes, voice tones and even from posture. Receive without the intrusion of instruction and with surely never a show of surprise."

Little children, when you are at last received into their confidence, reveal a most amazingly individual and true understanding of adults and the world about them.

Their comments when off their guard are deliciously refreshing.

"Grandma, Grandma's mad again, *mad,* but—she'll get over it."

" 'Pretty soon' means 'never'; it means you won't get it—never."

"Santa comes only to *good* children. He came to *me* just the same. *So!*"

Adults seldom are fortunate enough to penetrate to the child's individuality, because grown-up eyes see only the thick sugar-coating of sentimentality with which the adult imagination surrounds childhood.

But despite suppression this individuality will survive, Prof. Mearns believes, and needs only proper encouragement to emerge in adults. Escape is possible from the conventional, from cliches, from the "iterated wisdom of radio, screen and stage, all the tags of familiar quotation, all the trite observations that clutter colloquial speech." He describes the way in a new book, *The Creative Adult* (Doubleday, Doran).

The reward is a new poise, confidence, and serenity.

Science News Letter, February 3, 1940

ANATOMY

War Has Brought Shortage Of Good Human Skulls

IT MIGHT be guessed, offhand, that it would be the other way around, but the war has made human skulls scarcer. Skulls and skeletons seen in schools and doctors' offices are seldom home-grown, mostly imported, and war conditions in Europe and the Orient combined with greatly curtailed shipping facilities threaten a shortage.

Even so the finest quality skulls, perfect with natural teeth, cost only $32. Second rate skulls with slight defects but entirely suitable for general study are $15.

Science News Letter, February 3, 1940

PALEONTOLOGY—BOTANY

Puzzling Fossil Leaves Traced to Oriental Trees

FOSSIL leaf prints that look like poplar leaves but are not, which have been riddles to scientists for many years, have been traced to a family of trees now known only in Japan and China, by Dr. Roland W. Brown of the U. S. Geological Survey and the Smithsonian Institution.

The fossils have been found in rocks all the way from Greenland to Tennessee, and have been assigned to poplar, fig, and other plant families; but Dr. Brown was not satisfied. For many years he carried on patient scientific sleuthing, and finally was able to prove their true relationship by means of their association with fossil pods and seeds of the type of tree now known by its Japanese name, katsura.

In Washington, there is now one imported katsura tree, a young specimen growing on the grounds of the National Academy of Sciences. The last native katsura-relatives in this country died 70 or 80 million years ago, while dinosaurs still roamed the earth.

Science News Letter, February 3, 1940

IN SCIENCE

ORNITHOLOGY

Ducks Dive for Food To Depth of Ten Feet

BLACK DUCKS can dive for food on the bottom of water as much as ten feet deep, it has been demonstrated by Harry Leon Kutz, Cornell University zoologist. (*Journal of Wildlife Management*)

The feat of this common wild duck species is all the more remarkable because as a rule black ducks do not dive for their food at all, preferring to gather their food ashore. However, when Mr. Kutz dropped corn in water at depths of five, seven and ten feet, the black ducks competed successfully for it with mallards at the two shallower depths, and monopolized it at the ten-foot level.

That such a dive was not easy for the black ducks is evident from Mr. Kutz's description: "Preceding each dive a bird would assume a definite stance with neck fully extended upward and muscles tensed. Then with a powerful kick from both feet it would disappear beneath the surface of the water, the kick causing a splash of no inconsiderable proportions."

Science News Letter, February 3, 1940

ENGINEERING—BIOLOGY

Firefly's "Cold Light" Not Practical for Man

THE INTRIGUING glow of the firefly can be duplicated in scientific laboratories but the practical use of this "cold light" cannot now be considered because of its cost, Dr. N. S. Rustum Maluf of the Osborn Zoological Laboratory, Yale University, points out in the annual report of the Smithsonian Institution.

The firefly's light is produced by the oxidation — that is, burning — of the chemical substance, luciferin. Considering the amount of oxygen needed to produce the light, it is a wasteful process. It is far less efficient than most means of producing artificial light known to man: 1% compared with 4.54% for a carbon filament lamp, 17.17% for an acetylene flame, or 60% for the new sodium arc lights.

Science News Letter, February 3, 1940

NE FIELDS

CHEMISTRY

Old and New Plastics Are Helping To Fight Wars

PLASTIC materials are helping to fight wars, present and future. The armed forces of every nation, according to Dr. W. A. Hamor, Mellon Institute of Industrial Research, Pittsburgh, Pa., have turned to new and old synthetic resins, chemical-born substances called plastics because, although hard when finished, they are plastic during manufacture.

Some military applications of plastics: Laminated materials in airplane construction. Cast resins in guide lines on airplane carriers. Luminescent resins in various military devices. Tinted cellulose acetate windows for air-raid protection. Gun stocks from cellulose acetate and from fabric-filled phenolic resins. Shaped cellulose acetate sheet as a chute for conveying ammunition belts from ammunition boxes to machine guns in airplanes. The molding of mouthpieces and containers for gas masks from phenolic resins. The use of such a plastic as "koroseal" in gas masks for protection against mustard gas. The application of cellulose acetate in soldiers' goggles, The use of phenolics in the construction of the noses of anti-aircraft shells. The possible application of nylon as a parachute material.

Science News Letter, February 3, 1940

PHYSICS—BIOLOGY

Simplified Glass Heart Made from Flat Pieces

A NEW and simplified "glass heart" has been invented by Dr. J. A. Long, University of California zoologist. It differs from other circulation apparatus in that it contains no intricately shaped parts of blown glass, but consists entirely of flat pieces of plate glass or pyrex, with passageways and chambers cut and bored.

Pulsations to drive the fluid are set up in a short piece of rubber tubing, squeezed by an electro-magnet at intervals determined by the swing of an adjustable pendulum. Two simple valves consisting of small glass disks keep the flow going in the right direction.

Because of its flat shape, the "heart" can be mounted on a microscope for the study of eggs, embryos or other small living objects enclosed in its specimen chamber. Connections can also be made with larger organs or entire animals by means of canulas.

Another advantage due to flat shape and simplicity of construction is ease in cleaning and sterilization.

Science News Letter, February 3, 1940

ENGINEERING

Air Conditioning Aids in Munitions Production

AIR conditioning is playing a vital role in munitions manufacturing, in Europe's warring nations, in the production of time fuses for shells. These fuses explode the shell at a predetermined time after it leaves the gun and their timing is varied by artillery battery at will to meet a given range and trajectory.

Such fuses, to be useful, require extremely high precision in production. Air conditioning aids in securing such precision. Writing in *Refrigerating Engineering,* H. B. Matzen of New York describes America's World War practices on time fuse construction, which are still being followed, in many cases, today.

Air conditioning, he points out, assures constant temperature and humidity which means precision tooling of the metal parts of the fuse. Just as important, the powder trains, that burn to determine the interval of time the fuse will use up, can be packed with precise moisture content and thus retain uniformity.

By maintaining a comparatively high relative humidity, the danger of sparks in the plants was reduced. Excess perspiration on a worker's hands, that might unintentionally add moisture to a fuse, was decreased by stabilizing conditions of temperature and humidity.

Science News Letter, February 3, 1940

ZOOLOGY

War Causes Distress in London's Kensington Zoo

LONDON's world-famed Kensington zoo is a war victim. A sharp drop in donations, on which it relies for support, has caused the zoo's directors to appeal to the public to "adopt" animals and other specimens and to feed them.

A generous fish dealer, in particular, is being sought, to take care of the sea lions and penguins by supplying the fish that form their diets. The penguins and sea lions eat up a large part of the zoo's food appropriation.

Science News Letter, February 3, 1940

ORNITHOLOGY

Innocent Wandering Bird Causes Submarine Scare

A PEACEFUL and innocent bird, a common tern, caused a Nazi submarine scare in San Salvador.

The U. S. Biological Survey got the story because it was a band around the leg of the bird "with strange markings and ciphers" that was excuse for the excitement. San Salvadoreans not biologically inclined thought the bird was a messenger pigeon from a Nazi submarine. Actually the tern was an immigrant, having been banded last June at Ram Island, Mattapoisett, Mass.

Science News Letter, February 3, 1940

CHEMISTRY

Newest Synthetic Resin Is Plastic Worth Watching

MOST recent of chemical materials in the quickening parade of useful synthetic resins or plastics is methyl cellulose. Unlike its chemical cousin, ethyl cellulose, it is soluble in water. Like its cousin, it is highly versatile with a wide range of applications predicted for it in paper manufacture, textiles, cosmetics and food products. Odorless, colorless, completely non-toxic, methyl cellulose coatings are grease-proof, tough and highly flexible. It is a new material worth watching.

Science News Letter, February 3, 1940

AERONAUTICS

Wins Prize for Measuring Stresses During Flight

FOR a method of measuring vibration stresses of propellers, engines and other airplane parts during flight, a 25-year-old research engineer has been warded the 1939 Lawrence Sperry award and $250 prize of the Institute of the Aeronautical Sciences. He is Charles M. Kearns, Jr., of the Hamilton Standard Propellers division of United Aircraft Corporation.

Tiny graphite strips are cemented to the blades or other parts studied. Wires connect with an audio frequency amplifier similar to those used in radio sets. Vibrations set up fluctuations in an electric current passed through the plates. These electrical variations, recorded photographically by an oscillograph, allow computation of actual strains in the part being tested.

Mr. Kearns is only three years out of Pennsylvania State College.

Science News Letter, February 3, 1940

MILITARY SCIENCE

Movies for Soldiers

No Comedy, No Glamour in the Army's New Films; They Teach the Very Serious Business of War

By DR. FRANK THONE

SOLDIERS of the U. S. Army and National Guard are going to the movies in a big way nowadays.

No news in that? Sure, soldiers always have gone to the movies. *Les soldats Americains* vied for the privilege of escorting Mademoiselle to the cinema in Armentieres, until some inconsiderate Heinies dropped a big *obus* through the roof one afternoon and put the projection room out of action. . . . Or maybe it wasn't Armentieres, but some other town and some other Mademoiselle. Hard to remember; it was so long ago now.

But they're different movies nowadays, and no Mademoiselles. No pie-throwing contests, no cop-chase sequences, no modern glamour girls in these films the present-day doughboy attends. Not even a Mickey Mouse, although there are animated drawings. They're business films, deadly serious business—the business of modern war. No room for romance or comedy in that.

The Army now has a library of about fifty instruction films, covering all branches of the soldier's profession, from the elements of how to stand and salute and handle a rifle and march in close order, to the intricacies of machine guns and the recoil gear of heavy artillery. Some of the films are for new recruits (and their teachers), others obviously for soldiers further advanced in the special branches of their business.

For R.O.T.C., Too

There are of course several prints of all the more important films, so that instruction may go on simultaneously in many different places—all army posts and National Guard armories of any pretension have motion picture projectors nowadays. The films are also widely used in schools and colleges where military instruction is given to prospective young reserve officers. They are not available, however, for general public exhibition.

This great library of films will be used to the limit during the coming months, as an unprecedented recruiting campaign swells the ranks of the Regular Army to the strength of 227,000 now authorized, with thousands more piling into the National Guard to bring it up to its authorized strength of 235,000.

Such an influx of new men imposes a tremendous job of teaching on the officers and NCO's—the biggest educational task faced in this country since the crowded days of 1917. And Service officers hope to carry it through this time with greater economy and higher efficiency, thanks in part to the new aids in teaching.

Preparedness

One prime underlying idea is that if the American forces are known to be thoroughly well armed and well trained there will be less temptation on the part of European powers to underestimate them and hence to think it safe to flout and provoke the United States.

In 1917, German generals considered American troops to be "about equivalent to Rumanians" in fighting power—and they had just finished trampling Rumania into the dust. Had they been less mistaken then, it might not have become necessary for the AEF to teach them otherwise. The better prepared an army is known to be, the less likely it is to be compelled to use its weapons and its knowledge.

Made by Army

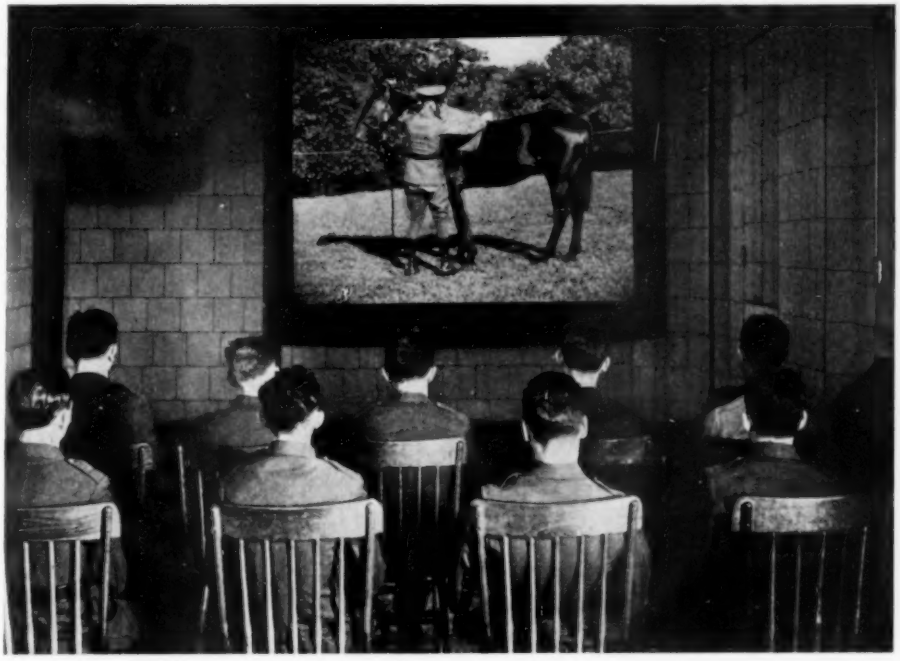
These military teaching films are not only of and for the Army, they are by the Army. The U. S. War Department maintains a "little Hollywood" at the Army War College in Washington, D. C., and two field production units constantly "on location" in important troop centers elsewhere.

In direct charge of the work is Major R. T. Schlossberg, with headquarters in the War Department in Washington. Assisting him are several officers who took a special course of training in Hollywood to qualify for the task, together with a group of non-commissioned officers and enlisted men of the Signal Corps, and a number of civilian technicians.

All the photographic, studio and laboratory tricks in the Hollywood repertoire are used by these Army film mak-

NOT HOLLYWOOD STUFF

This is the real thing. Army camera men filming the firing from a machine gun nest.



INSTRUCTION

First lessons in riding can be given in a movie theater—its easier on both "rookies" and horses.

ers: straight shots, lap-dissolves, slow-motion, lifelike models, animated drawings. Any combination of these devices is used that promises to get the idea across most effectively.

Some of the work with models and animation is startling in its realism. In the recently completed film on first aid in the field, a soldier is first shown with what purports to be a bad wound in his upper arm. A partial view of arm and shoulder of the living subject dissolve into an exact model done in wax, with the arm bared. A concealed pump spurts what seems to be blood out of the wound with the rhythmic jets that warn of a severed artery. Experienced officers have confessed that the sight has made them giddy, though they knew that the arm was wax and the "blood" only catsup. The film goes on to show how to save a life by the use of tourniquet and compress applied at the right spots.

Use Celluloid

In preparing the animated drawings, the now familiar device of moving models of transparent celluloid, with cutout parts that change position, is effectively employed. For some things, notably the action of artillery recoil systems and other complex mechanical contrivances, animated drawings are the only practical way to show in detail how they work.

One of these films would be of unusual interest to World War artillery veterans. It shows exactly how the recoil mechanism of the famous French 75-millimeter field piece operates. That was kept a closely guarded secret, even from the men who used the guns, back in 1918.

Thorough

One thing that never fails to strike the critical observer, on first view of one of these films, is the patient thoroughness with which every point is developed. They are quite unlike ordinary entertainment films in this respect. The latter of course must aim at swift action: a quick suggestion, a partial development of an idea, is often sufficient for their purpose; the spectator's own mind supplies the rest.

Not in these Army instruction films, however: any neglected detail, any glossed-over point, might cost the soldier his life in a critical action, might mean the crippling of a great gun or an airplane or a tank. So every point is shown in full detail, while the explaining voice of the instructor flows steadily and authoritatively alongside it on the sound track. It is an amazingly good job of pedagogy: makers of films for school and college use could very profitably study these martial movies for helpful suggestions in method.

The step-by-step thoroughness of instruction appears to especially striking advantage in the animated-drawing films. These always start with the complicated apparatus stripped down: the empty cylinder of a recoil mechanism, the bare frame of a machine gun. Piece by piece, as if an invisible hand were assembling the mechanism, the various parts appear. As each one flashes into view, a pointer rests on it, the voice from the sound track tells what it is and on what principles it operates. Then the next part appears, with the next stage in the explanation.

Good Students

The new generation of soldiers comes well prepared to get maximum advantage of this type of instruction. The average recruit of today has had high school training, and most high schools nowadays have motion picture projectors.

There is a great variety of subjects available in the Army's film library. In addition to "close-up" instruction in the operation of the principal weapons, there are also films showing the proper handling of troop units in the field: a battery of artillery on the march and in action, machine guns employed in both attack and defense, infantry crossing a deep stream without the aid of a bridge, infantry going into action, the work of the Signal Corps, how the Medical Corps takes care of the wounded, the possibilities and limitations of tanks and other combat vehicles, etc. There are also several films contributed by the U. S. Bureau of Mines, on such subjects as gasoline engines and the avoidance of carbon monoxide poisoning.

Two or three of the films are World War veterans, dating back to 1917-18; they cover subjects that have not changed materially in 20 years, like the construction and use of shrapnel projectiles. The great majority, however, were made in the last few years, and give the latest

LANGUAGES
Made *easy* By
LINGUAPHONE

This amazing new Method enables you, *in your own home,* to speak and read any of 27 foreign languages in an incredibly short time. Endorsed by leading university professors and thousands of men and women as the quickest, simplest and most thorough language method. Send for FREE book.

LINGUAPHONE INSTITUTE
31 RCA Building New York City

NO MICKEY MOUSE

Army artist (left) working on animation drawing for a film of submarine mines. At the right is a Signal Corps camera in action, making an animated drawing.

word in the construction and use of weapons, field tactics, and the auxiliary services in the Army.

The earlier films, as might naturally be expected, are silent, but all the newer ones have sound tracks. All are available in the standard 35-mm. width, and a good many of them in the 16-mm. size as well. The newest ones come in editions fitted for the recently perfected 16-mm. sound projection apparatus.

In producing these films, the Army has again shown its capacity for getting large results out of modest resources. The building in which they are made, at the Army War College, certainly has nothing of the expansive, flamboyant atmosphere of Hollywood about it. It is an ordinary-sized brick structure, not suggesting by its rather ordinary exterior the close-packed hive of industry within.

There certainly isn't any waste space. All the rooms are carefully allotted: drafting rooms, photographing rooms, developing rooms, a few small offices. Yet there is no sense of crowdedness, rather of compactness; one gets the feeling that this is the work of men trained in dealing with equipment that may have to be packed on muleback, or in a caisson, or loaded in a tarpaulin-covered truck.

Storage is in a specially built, well-constructed brick vault building. Here are kept also many thousands of feet of now priceless film that record some of the most stirring events of 1917-18. It is a veritable storehouse of recent military history.

This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines. Copyright, 1940, by Every Week Magazine and Science Service.

Science News Letter, February 3, 1940

PSYCHOLOGY

Emotional Stability Determined By Aid of Electric Shocks

Measurement of Perspiration in Palms Reveals How Long It Takes to Recover From Such a Sudden Strain

SHOCKING persons into cold sweats in the hope of developing a simple, but scientific, measuring stick to determine how much emotional strain a person can take without danger of "cracking up" is the work being carried out by Dr. G. L. Freeman of Northwestern University.

Dr. Freeman is stimulating the higher nerve centers of human "guinea pigs" with electrical shocks and then carefully measuring their sweat excretions to learn how long it takes them to get back to the normal balance of a relaxed condition.

"If unexpected, the electrical jolts create emotional strain or startle and stimulate the sweat glands, the amount of the perspiration indicating how much bodily energy is mobilized in reacting to the displacing stimulus," Dr. Freeman pointed out.

Measurements of the perspiration in the palms of the subject's hands as taken with an electrical device during a resting period prior to the electrical jolt, during the shock and after the current is turned off, are Dr. Freeman's measuring stick. The same machine that delivers the shock is used to record the subject's "recovery quotient," the R. Q., the time it takes for the sweating to return to the normal or pre-shock level.

"Neurotic persons have a much slower R. Q. than do normal individuals," Dr. Freeman announced. "What holds for the simple startle stimulus is also apparently true when the persons are placed under more serious mental strain and emotional conflict."

Subjects having long recovery times tend either to lie virtually inert after the shock or they squirm to excess, it was found. Dr. Freeman said that this might differentiate the maniac type from moody persons who brood for long periods and bottle up their emotions. Both are neurotic because of inability to find physiologically adequate motor outlets for the emotional strain, he asserted.

Less neurotic individuals frequently react merely by throwing out their hands and shouting some expletive of surprise, the psychologist reported.

"They recover equilibrium immediately following this adequate discharge of their emotional load and are ready for other displacing stimuli," Dr. Freeman concluded.

Science News Letter, February 3, 1940

Florida will investigate its chances of successfully growing paprika, which is now imported from Europe—about $2,000,000 worth a year.

BOOKS

SCIENCE NEWS LETTER will obtain for you any American book or magazine in print. Send check or money order to cover regular retail price and we will pay postage in the United States. If price is unknown, send $5 and the change will be returned. When publications are free, send 10c for handling. Address:

Book Department

SCIENCE NEWS LETTER
2101 Constitution Ave.
Washington, D. C.

RADIO—AERONAUTICS

German Bombers Believed Getting Directions by Radio

Neutral Stations Unwittingly Serving for Bearings With Radio Compasses; May Use Ultra Short Wave, Too

GERMAN bomber - reconnaissance planes, the accuracy of whose long distance flights to pinpoint objectives in England and France like the Shetland Islands has been mystifying many, have probably been making use of neutral radio stations as unwitting partners in their ventures.

They are probably taking radio direction bearings on Belgian, Dutch, Luxemburg and Swiss stations by means of radio compasses and specially prepared charts showing the particular bearings they ought to get on one point in order to arrive at another, it is believed.

British and French program stations have either been shut down or moved to secret sites so as not to give away the location of the metropolitan centers in which they are normally located.

The possibility that "radio fixes" could also be secured by spies equipped with ultra short wave transmitters is also to be considered. Warplanes cannot, of course, use ordinary peacetime radio navigation methods as they would give away the raiders' location.

A continuous wave in the television bands, not now used as all television broadcasting stopped with the outbreak of war, can be transmitted by simple and light apparatus consisting of little more than a battery, a piece of brass pipe and some wires. Even without anything more than rudimentary antenna, experts believe a skilled operator could send out a wave which a plane's radio compass could pick up at a distance of 50 to 75 miles or more. Ultra short waves, like light, do not carry beyond the horizon, but the receiving plane would be well above the horizon—as high as 27,000-30,000 feet or even higher. War flights at those altitudes are not rare. One German bomber was caught at a height of 27,000 feet.

Such radio equipment would be difficult to hunt down.

Science News Letter, February 3, 1940

PHOTOGRAPHY

Photo Stencils of Fine Wood Used on Low Cost Furniture

IF YOU see a beautiful piece of furniture these days at an amazingly low price look carefully. It may be made by a new process in which the art of photography is now used to make stencils, simulating the finest, rarest of woods, for finishing low-cost furniture.

By this new advance a photographic representation of rare walnut lumber can be placed on inferior wood so skillfully that the layman cannot tell the difference. By the same means printing can be accomplished on metal objects like signs and on leather, rubber, glass, ceramic products, felt and textiles.

In the new process, adapted by Harry L. Hiett of Chicago, a photograph is made of the rare wood. The negative shows the intricate grain of the wood. This negative is laid on a special sheet of sensitized gelatine with a firm celluloid backing. Through the backing, light from an electric light shines for a ten minute exposure.

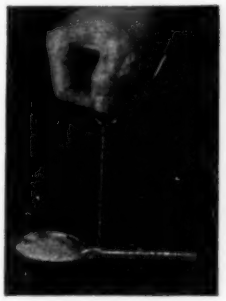
The resulting print is developed by washing it in warm water until the purple dye of the gelatine is removed and the hot water partially dissolves the gelatine in proportion to the depth of high lights and shadows. Both development and printing take place in a lighted room.

When developed the gelatine is laid on a glass surface and over it is placed a strip of fine mesh silk cloth. With a soft blotter the silk is pressed into the soft gelatine until it is firmly embedded. When dry the celluloid falls away from the design leaving a perfect stencil on the silk.

With the stencil ready the low cost board on which the design is to be printed, is next placed on the bed of a special press. On top of it goes the silk stencil. Then special paint is squeezed through the silk stencil directly on to the surface of the wood.

The varying thickness of the gelatine sheet, formed by the highlights and shadows in the original photograph, offer varying resistance to the passage of the paint and the result is a replica—though only paint deep—of the beautiful rare wood design.

Science News Letter, February 3, 1940



Garden Experiments

SCIENCE HOBBIES

WEIGH-SPOON Beautifully made—easy to use in dark or light—set counter-weight on handle, scoop chemical and balance—accurately measures ⅛ to 10 grams. Complete with conversion table, grams into grains.....$1.00

●

COMPLETE SOILLESS GARDENING KIT
Soilless salts (17 Elements) to make 15 gals. solution,
Iron citrate,
7-in-1 measuring spoon,
Pamphlet of directions,
Exp. Station Bulletin on subject
COMPLETE $1.50

●

COLCHICINE—at lowest prices — Experiment in your garden with this easy to use drug which doubles, quadruples chromosomes, produces giant never before existing plants, huge fruits, doubled flowers, makes sterile crosses fertile, some annuals into perennials. An import from Germany and Italy, price subject to change
½ oz.....$21.00 1/8 oz.....$6.00
100CC 0.6% solution.....$2.00
Vial of Colchisalve (experimental station formula) easiest to apply.....$2.00

FREE WITH EACH COLCHICINE ORDER
N. Y. STATE EXP. Station Bulletin No. 183
Free with any of the above orders (if you order now) 1 Vitamin B1 pill to make 2 gal. solution.

●

Recommended books (sent with your order)
Soilless Growth of Plants—Ellis and Swaney $2.75
Partner of Nature—Luther Burbank.....$3.00
(One of the most interesting books we have ever read and the most indispensable to any lover of nature, experimenter or not.)
Quest—Science Summary—for science and hobbies. Sample 25c

●

Fisher 1940 Mt-SCOPE — for detecting buried metals, ores, meteorites, etc.—send 10c for circular.
(send your check, cash etc., all orders postpaid)
(C.O.D. orders 25% deposit)

CAMBRIDGE LABORATORIES
Wellesley, Mass.

MILITARY SCIENCE

German Artillery Has Few Surprises, Says U.S. Expert

Limited Resources, Technology No Better Than Ours, And Army to Supply Make New Developments Unlikely

By PROF. H. W. MILLER

University of Michigan

Prof. Miller, Colonel of Ordnance Reserve, was chief engineer of heavy artillery in the A. E. F., and had charge of the collecting of captured German heavy guns brought to this country. He is the author of The Paris Gun, standard book in England and Germany on the long-range gun that shelled Paris in the spring of 1918.

DON'T expect artillery miracles of the Germans, when their heavy guns begin to pound at the Maginot Line.

It is highly unlikely that the Fuehrer's ordnance officers have any great surprises up their sleeves. With limited fiscal and material resources, technology no better than our own (and in many respects not as good), and a tremendous new army to supply with imperatively necessary rifles, machine guns and small-caliber artillery, they have had little opportunity to develop any overwhelming "trick stuff."

There is a real tendency in the press of today to overestimate the quality of German artillery. In the main they have simply put into production World War designs, with some few obvious improvements for transportation. I am referring particularly to rubber-tired wheels, which have become a necessity for armies in rapid movement.

However, even here the Germans seem to be lagging. They have not adopted the balloon tires now common in other armies. Their guns have solid rubber tires, like old-fashioned trucks, and some of them are apparently still rolling on steel-tired wooden wheels of the old World War types. This indicates very clearly a limit in their supplies of materials and a limit on their production capacity for new transportation devices.

How prone we are to imagine that other peoples can accomplish industrial miracles which even the greatest industrial nation on earth finds itself unable to achieve! I found throughout the World War that we were crediting Germany with the ability to accomplish things and produce miraculous devices that we knew ourselves unable to develop. Now we are once more crediting a potential adversary with the same ability.

We all realize how long it takes to put on a major armament program. With all of the manufacturing establishments for heavy equipment in this great nation, it is rather absurd to imagine that a nation of much inferior industrial capacity can perform so much more than we can.

It seems to me quite safe to assume that the Germans have a very limited supply of the heaviest artillery. They were compelled first of all to equip themselves with 37-millimeter guns, machine guns, semi-automatic guns for as much of their infantry as possible, 77-millimeter field guns, anti-aircraft guns —and only then could they begin on some of the heavier artillery.

I feel sure that the pictures which I have seen of four railway carriages carrying guns of either 170 or 210 millimeters are always pictures of the same four guns. There is some little evidence that they may have constructed at least one of the large carriages for the 381-millimeter (15-inch) naval gun. Several of these would be of real value in the bombardment of gun and supply positions in the rear of the Maginot Line. But one must not imagine that they can be made overnight. It requires a long time and unusual facilities to manufacture them.

All of this constitutes a very important reason why Mr. Chamberlain and M. Daladier cannot give Hitler any more time to build more of this equipment. He has the full facilities of the Skoda plant, now that Czechoslovakia does not exist, and if he has enough skilled workmen to operate it he can of course step up his production of this kind of equipment.

One more year of enforced slave labor might enable him to produce an amount of equipment that would be more than the French and the British could cope with.

Science News Letter, February 3, 1940

● RADIO

Dr. Wanda K. Farr, director of the Cellulose Laboratory of the Boyce Thompson Institute for Plant Research, will tell how the living plant makes cellulose as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, February 8, 4:15 p.m., EST, 3:15 CST, 2:15 MST, 1:15 PST.

Listen in on your local station. Listen in each Thursday.

AGRICULTURE

Tear Gas Effective As Killer of Insect Pests

CHLOROPICRIN, the poison gas that makes strong men weep on the battlefield, does worse than that to the hordes of insect enemies that ruin grain in storage. It kills them outright. Kenneth L. Knight, University of Illinois entomologist, reported on the results of 135 large-scale experiments with chloropicrin fumigation.

Grain in loose-woven sacks was simply placed in a tight vault and mass fumigation methods used. When the grain was in tighter, lined sacks the gas had to be injected into each sack separately. This was slower and more expensive, but because of the better protection, reinfection with the pests was less likely to occur.

Science News Letter, February 3, 1940

It takes a silkworm three days to spin 1,000 yards of unbroken thread.

SCIENCE NEWS LETTER SUBSCRIPTION COUPON

To Science News Letter, 2101 Constitution Avenue, Washington, D. C.

☐ Start ☐ Renew my subscription to SCIENCE NEWS LETTER for ☐ 1 year, $5 ☐ 2 years, $7

Name_____

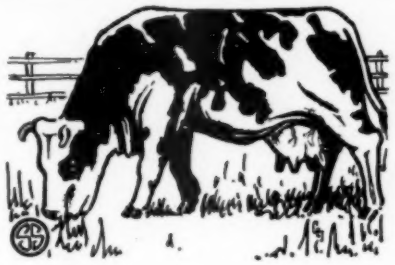
Street Address_____

City and State_____

(No extra postage to anywhere in the world)

ECOLOGY

NATURE RAMBLINGS
by Frank Thone



Ecologist at Work

A QUIETLY dramatic human-interest story of how one old man, with only his hands, a shovel and a few cows, redeemed half a square mile of Arizona rangeland from ruin, was told before the recent meeting of the Ecological Society of America by Prof. Charles T. Vorhies of the University of Arizona.

The central figure of the story, identified by Prof. Vorhies only as "a Mr. Page" was already 65 years old when he bought the half-section of over-grazed, weed-grown, rodent-infested land. That was 17 years ago. He put a fence around it, built his house, and set to work to nurse the land back to normal health.

He used no irrigation, not even contouring or terracing. He just let the native grasses grow, and as he went out in the evening to bring home his cows he carried his shovel, knocking out a few of the worst weeds as he walked along. The grasses would have driven out the weeds anyway, but probably Mr. Page did not know this; at any rate he hastened the process.

He got rid of burrowing animal pests (kangaroo rats and huge ant colonies were the worst of them) by a simple device that conserved soil water at the same time. Wherever he found a burrow or an ant nest he built a pair of V-shaped earth ridges, to turn run-off water into it. The next time it rained, the pest problem was automatically taken care of.

In addition to his four or five cows, Mr. Page has a small orchard and vegetable garden. Water for his domestic needs he stores in a cistern, and he has earth-dam ponds to take care of his stock. On this simple but sufficient basis, adapting their ways to the ways of the land instead of fighting and abusing it, Mr. Page and his wife have solved their own farm problem in their own commonsense way.

Quite possibly Mr. Page never heard of such a "professor's word" as ecology. But he is a living example of its successful practice.

Science News Letter, February 3, 1940

GEOLOGY

Oil Discoveries In Nebraska Based on Success In Michigan

New Finds Are Based on Two Years of Exploration Following Corrugations in Geologic Basin Underground

SO THE successful discovery of oil in Michigan and in Illinois can be credited the new discovery of petroleum in Nebraska at Falls City, near the Kansas border, according to scientists of the U. S. Bureau of Mines.

The petroleum finds in Michigan and Illinois were based on geologic "basins" which look like some giant dinner platter with a corrugated bottom. Overlying the basin is surface material — in the case of Michigan, glacial drift — so that the ground level over the drift is not by itself indicative of the underlying depression in rock strata.

The new Nebraska finds have been based on two years of exploration of the Forest City basin, an area comparable to, though smaller than, the Michigan basin.

Typical trick of geologists in searching for petroleum in a basin area is to follow "trends," the lines of the corrugations. A network of these corrugations is worked out and wells drilled at the intersections of the trend lines.

Production in the first Nebraska well is small and it appears that the operators will have to push the well greatly to get sufficient oil to win the $15,000 prize offered by the state legislature for the first well which will produce 50 barrels daily for 60 days.

In much greater production is the Mississippi discovery of oil, also recently reported, in Yazoo County. Over 700 drilling permits have been issued but the possible extent of this field has not yet been determined.

The proved oil resources of the nation have been increasing yearly, say Bureau of Mines scientists. They point out that there is a significant change in prospecting methods as the cupped-over domes and anticline structures are being exploited.

More and more, stratigraphic studies are being employed and the Michigan, Illinois and now the Nebraska discoveries are of this type. Methods of soil-gas analysis too are supplementing electrical and magnetic methods of geophysical prospecting. It has been discovered that a region which has a low permeability to oil and gas seepage has the ability to trap gas and oil over water in many cases. If the seal is tight enough a pocket of gas and oil forms to await the drilling of a well which will tap its hidden wealth.

Science News Letter, February 3, 1940

The character of early Greek art is only gradually being revealed, says Gisela M. A. Richter of the Metropolitan Museum of Art; adding, "we know now that the graceful, smiling types of the developed sixth-century B.C. archaic art were preceded by bolder, sterner conceptions."

Plant Experiments
THE WORLD'S MOST FASCINATING HOBBY

GROW PRIZE-WINNERS
CREATE UNHEARD OF PLANTS
IN GARDEN - HOUSE - CLASSROOM

SOILLESS GARDENING (growing plants in chemicals) **COLCHICINE** (revolutionary chemical creates giant new unheard of plants and fruits, huge doubled and redoubled flowers) **PHOTOSENSIN** (makes plants vitally super-sensitive to light) **VITAMIN B1** (produces giant, prize-winning "MYSTERY" flowers) **INSULATED GREENHOUSES** (electric lamps only heating plant required, use less glass makes greenhouses available to many)—the above mentioned articles plus page after page of **SCIENCE** and **MEDICINE**—and—

OVER 40 PAGES OF ILLUSTRATIONS
appear in the

GIANT - YEARBOOK - SPRING 1940
OF GARDEN EXPERIMENTS

It contains information costing more than ten dollars in separate book form.

GIVEN FREE, one YEARBOOK with each introductory 5-issue trial subscription to QUEST—Science Summary—A most interesting scientific periodical—this offer good for 10 days only.

Send your check, $1.00 bill, etc., to

QUEST STARTS NOW — **QUEST B-1** Wellesley, Mass. — YEARBOOK sent as soon as off the press

•First Glances at New Books

Physics—Philosophy

THE PHILOSOPHY OF PHYSICAL SCIENCE —Sir Arthur Eddington — *Cambridge (Macmillan),* 230 p., $2.50. Over a decade has passed since Sir Arthur wrote *The Nature of the Physical World.* The last two chapters of this book outline a general philosophical outlook which, he believes, a scientist can accept without inconsistency. He feels that the domain of subjectivity has been extended in recent years through our better understanding of quantum mechanics.

Science News Letter, February 3, 1940

Agriculture—Education

THE AGRARIAN REVIVAL, A Study of Agricultural Extension—Russell Lord—*Amer. Assn. for Adult Education,* 236 p., $1.50. The story of the agricultural extension movement, especially in its latter-day relation to the AAA, compactly and vividly told by a writer who has long been intimately associated with agrarian affairs and is well acquainted with land-life leaders both in and out of official position. This book will commend itself naturally to country readers, and it should be made a "required subject" for all city dwellers.

Science News Letter, February 3, 1940

Ornithology

CANADIAN LAND BIRDS, A Pocket Field Guide—P. A. Taverner—*McKay,* 277 p., $2.50. It is gratifying to see a compact, well-illustrated bird book, in the same style as the well-known Putnam field guides, prepared especially for use in the Dominion. This book will of course be highly useful in states that are nearest neighbors to the Canadian provinces.

Science News Letter, February 3, 1940

Education

THE CREATIVE ADULT, Self-education in the Art of Living—Hughes Mearns—*Doubleday, Doran,* 300 p., $3. See page 72.

Science News Letter, February 3, 1940

Medicine

A DOCTOR WITHOUT A COUNTRY—Thomas A. Lambie—*Revell,* 252 p., $2. The saga of a medical missionary who renounced his allegiance to the United States to become an Ethiopian and who is now a man without a country.

Science News Letter, February 3, 1940

Psychology

STUDENT'S GUIDE FOR BEGINNING THE STUDY OF PSYCHOLOGY (Rev. ed.)—Willard Lee Valentine—*Prentice-Hall,* 249 p., $2. From Ohio State University, this laboratory manual is intended for use with a standard elementary text and also an adequate library for reference. Its purpose is to eliminate widespread superstitions and misconceptions regarding human behavior as well as to aid in the acquisition of psychological principles and skill in their applications.

Science News Letter, February 3, 1940

Statistics

STATISTICAL DICTIONARY OF TERMS AND SYMBOLS—Albert K. Kurtz and Harold A. Edgerton—*Wiley,* 191 p., $2. A needed desk book for any of those who work with facts and figures in any of the sciences, or need to understand what others write often in cryptic language or tables or formulae.

Science News Letter, February 3, 1940

Medicine

LANE MEDICAL LECTURES: VIRUSES AND VIRUS DISEASES—Thomas R. Rivers—*Stanford Univ. Press,* 133 p., $1.75, paper; $2.50, cloth. For physicians and other medical scientists; too technical for the lay reader.

Science News Letter, February 3, 1940

Nutrition

YOUR CHILD'S FOOD—Miriam E. Lowenberg—*Whittlesey House,* 299 p., $2.50. Mothers and others concerned with feeding children will find much useful information in this book which not only gives recipes, menus and general information and advice, but takes up such special problems as the child with food allergy, meals for special occasions, and even gives valuable hints on the best ways to cook vegetables.

Science News Letter, February 3, 1940

Geography

PUERTO RICO AND THE VIRGIN ISLANDS —Daisy Reck—*Farrar and Rinehart,* 241 p., $2.50. Leaving guide-book details to more utilitarian volumes, Miss Reck tells what she has found interesting and important in sights and scenes of these islands. It is a very pleasing "informal introduction."

Science News Letter, February 3, 1940

Science—Education

CHILDREN'S CHOICES IN SCIENCE BOOKS —Alice Marietta Williams—*Teachers College, Columbia Univ.,* 163 p., $1.85. Discovering elements in science books that appeal to children. This will interest teachers, librarians and authors. Children appreciate features which grown-ups consider worth while, such as informative and authentic illustrations and direct statements of fact rather than "rhetorical rhapsodies."

Science News Letter, February 3, 1940

Aeronautics

HOW TO BE AN AVIATOR—Dick Merrill and George Daws—*McBride,* 192 p., $2. A famous airline pilot and his collaborator give you the A B C's of how to be an aviator. From this little book you will get the thrill of flying, but, even more important, you will also get an understanding of the slow and often tedious training and skill which is required, and the endless need for care, and still more care, that makes flying safer with each passing year.

Science News Letter, February 3, 1940

Hygiene—Education

WAYS TO COMMUNITY HEALTH EDUCATION—Ira V. Hiscock, Mary P. Connolly, Marjorie Delavan, Raymond S. Patterson and William H. F. Warthen—*Commonwealth Fund,* 306 p., $3. This book gives health educators the specific information they want and need, whether they are planning a public meeting, a moving picture, a newspaper story or an exhibit. Written by authorities of long experience, it is sound, practical, and comprehensive.

Science News Letter, February 3, 1940

Medicine

DO YOU WANT TO BECOME A DOCTOR? —Morris Fishbein—*Stokes,* 176 p., $1.50. Within this small book is a wealth of specific information about medical schools, their requirements and tuition fees, hospital interneships, training in special branches of medicine, the business side of medicine, including advice on setting up a practice, and the characteristics required in the boy or girl who wants to become a doctor.

Science News Letter, February 3, 1940

Anatomy

ATTAINING WOMANHOOD, A Doctor Talks to Girls About Sex—George W. Corner—*Harper,* 92 p., $1. A book for high school girls that will help them and their parents.

Science News Letter, February 3, 1940

Embryology

THE RISE OF EMBRYOLOGY—Arthur William Meyer—*Stanford Univ. Press.,* 367 p., $6. Embryologists and students of the history of science alike will welcome this well-digested study of the beginnings of one of the most important of the biological sciences. Although tremendous labor must have gone into the making of this book, the task has been so thoroughly done that the result does not appear labored. That a work so erudite should be so readable is in itself a triumph.

Science News Letter, February 3, 1940